

IN THE CLAIMS:

The status of each claim that has been introduced in the above-referenced application is identified in the ensuing listing of the claims. This listing of the claims replaces all previously submitted claims listings.

1. (Previously presented) A conductive structure for connecting a contact pad of a semiconductor device and a contact pad of a substrate, comprising:
a female member comprising dielectric material and configured to be secured to the contact pad of one of the semiconductor device and the substrate, said female member defining an aperture configured to be located over the contact pad;
a conductive center partially filling said aperture, with an upper portion of said aperture being open;
a male member configured to be secured to the corresponding contact pad of the other of the substrate and the semiconductor device, said male member including an end configured complementarily to said upper portion of said aperture of said female member, said male member including an aperture configured to be located over the corresponding contact pad; and
a conductive center substantially filling said aperture of said male member.
2. (Previously presented) The conductive structure of claim 1, wherein said aperture of said female member is configured to partially limit insertion of said male member thereinto.
3. (Previously presented) The conductive structure of claim 2, wherein said aperture comprises an inner ledge configured to prevent further insertion of said male member thereinto.
4. (Original) The conductive structure of claim 2, wherein said aperture tapers inwardly.

5. (Previously presented) The conductive structure of claim 1, wherein an outer surface of said male member is configured to partially limit insertion of said male member into said aperture of said female member.

6. (Original) The conductive structure of claim 5, wherein said outer surface is tapered.

7. (Original) The conductive structure of claim 6, wherein said outer surface has a frustoconical configuration.

8. (Previously presented) The conductive structure of claim 5, wherein said male member has an end portion with a smaller periphery than a base portion of said male member.

9. (Previously presented) The conductive structure of claim 8, wherein said outer surface comprises an outer ledge between said end portion and said base portion of said male member.

10. (Previously presented) The conductive structure of claim 1, wherein at least one of said male member and said female member comprises a photopolymer.

11. (Previously presented) The conductive structure of claim 10, wherein said at least one of said male member and said female member comprises a plurality of superimposed, contiguous, mutually adhered layers of said photopolymer.

12. (Previously presented) The conductive structure of claim 1, wherein said aperture of said female member is configured to facilitate alignment of said male member and said female member.

13. (Original) The conductive structure of claim 12, wherein said aperture tapers inwardly.
14. (Previously presented) The conductive structure of claim 1, wherein an outer surface of said male member is configured to facilitate alignment of said male member and said female member.
15. (Original) The conductive structure of claim 14, wherein said outer surface tapers outward from said end to a base portion thereof.
16. (Original) The conductive structure of claim 15, wherein said outer surface has a frustoconical configuration.
17. (Original) The conductive structure of claim 1, wherein at least one of said conductive centers comprises at least partially unconsolidated conductive material.
18. (Previously presented) The conductive structure of claim 17, wherein said at least partially unconsolidated conductive material is at least partially uncured conductive resin.
19. (Original) The conductive structure of claim 18, wherein said at least partially uncured conductive resin is uncured conductive resin.
20. (Original) The conductive structure of claim 1, wherein at least one of said conductive centers comprises a thermoplastic conductive elastomer.
21. (Original) The conductive structure of claim 1, wherein at least one of said conductive centers comprises a solder, a metal, or a metal alloy.
22. (Canceled)

23. (Currently amended) The semiconductor device component of ~~claim 22~~claim 30, wherein said substrate comprises a flip-chip type semiconductor device.

24. (Original) The semiconductor device component of claim 23, wherein said flip-chip type semiconductor device comprises a flip chip die.

25. (Original) The semiconductor device component of claim 23, wherein said flip-chip type semiconductor device comprises a ball grid array package.

26. (Currently amended) The semiconductor device component of ~~claim 22~~claim 30, wherein said substrate comprises a chip-scale package.

27. (Currently amended) The semiconductor device component of ~~claim 22~~claim 30, wherein said substrate comprises a carrier substrate.

28. (Currently amended) The semiconductor device component of ~~claim 22~~claim 30, wherein said first member is configured to contain said conductive center over said at least one contact pad.

29. (Canceled)

30. (Currently amended) ~~The~~A semiconductor device component ~~of claim 29~~,
comprising:
a substrate having at least one contact pad exposed at a surface thereof;
a first member of an alignment structure:
secured directly to and protruding from said at least one contact pad;
including an aperture through the length thereof; and

~~wherein said first member is configured complementarily to and to be received by an~~
~~aperture formed in said a second member of said conductive structure, with said~~
~~second member secured to a corresponding contact pad of another substrate of~~
~~another semiconductor device component; and~~
a conductive center in said aperture of said first member, with said conductive center being
laterally confined within at least a base portion of said aperture and substantially filling
said aperture.

31. (Canceled)

32. (Currently amended) ~~The A~~ semiconductor device component ~~of claim 31,~~
comprising:
a substrate having at least one contact pad exposed at a surface thereof;
a first member of an alignment structure:
secured directly to and protruding from said at least one contact pad;
including an aperture through the length thereof;
configured complementarily to a second member of said conductive structure, with said
second member secured to a corresponding contact pad of another substrate of
another semiconductor device component; and
including an outer surface having a smaller periphery at an end thereof than at a base
portion thereof, wherein said outer surface includes including an outer ledge
located between said end and said base portion; and
a conductive center in said aperture of said first member, with said conductive center being
laterally confined within at least a base portion of said aperture and substantially filling
said aperture.

33. (Currently amended) The semiconductor device component of ~~claim 31~~ claim 32,
wherein said outer surface tapers outwardly from said end to said base portion.

34. (Original) The semiconductor device component of claim 33, wherein said outer surface has a frustoconical configuration.

35. (Canceled)

36. (Currently amended) The semiconductor device component of ~~claim 35~~claim 38, wherein said aperture is configured to receive at least an end of said second member.

37. (Canceled)

38. (Currently amended) ~~The A~~ semiconductor device component of ~~claim 37~~,
comprising:
a substrate having at least one contact pad exposed at a surface thereof;
a first member of an alignment structure:
secured directly to and protruding from said at least one contact pad;
including an aperture through the length thereof, an upper portion of said aperture having
a larger periphery than a base portion of said aperture, wherein with an internal
ledge is being disposed around at least a portion of a wall of said aperture between
said upper portion and said base portion; and
being configured complementarily to a second member of said conductive structure, with
said second member secured to a corresponding contact pad of another substrate
of another semiconductor device component; and
a conductive center partially filling said aperture of said first member, with said conductive
center being laterally confined within at least a base portion of said aperture.

39. (Currently amended) The semiconductor device component of ~~claim 37~~claim 38, wherein said aperture tapers inwardly from said upper portion to said base portion.

40. (Currently amended) ~~The~~ A semiconductor device component ~~of claim 22,~~
comprising:
a substrate having at least one contact pad exposed at a surface thereof;
a first member of an alignment structure:
secured directly to and protruding from said at least one contact pad;
including an aperture through the length thereof; and
configured complementarily to a second member of said conductive structure, with said
second member secured to a corresponding contact pad of another substrate of
another semiconductor device component; and
~~wherein said a~~ conductive center comprises ~~comprising~~ an at least partially unconsolidated
conductive material in said aperture of said first member, with said conductive center
being laterally confined within at least a base portion of said aperture.

41. (Original) The semiconductor device component of claim 40, wherein said at least partially unconsolidated conductive material is an at least partially uncured conductive resin.

42. (Original) The semiconductor device component of claim 41, wherein said at least partially uncured conductive resin is an uncured conductive resin.

43. (Currently amended) ~~The~~ A semiconductor device component ~~of claim 22,~~
comprising:
a substrate having at least one contact pad exposed at a surface thereof;
a first member of an alignment structure:
secured directly to and protruding from said at least one contact pad;
including an aperture through the length thereof; and
configured complementarily to a second member of said conductive structure, with said
second member secured to a corresponding contact pad of another substrate of
another semiconductor device component; and

~~wherein said a~~ conductive center comprises comprising a thermoplastic conductive elastomer in said aperture of said first member, with said conductive center being laterally confined within at least a base portion of said aperture.

44. (Canceled)

45. (Currently amended) ~~The A~~ semiconductor device component of claim 22, comprising:
a substrate having at least one contact pad exposed at a surface thereof;
~~wherein said a~~ first member of an alignment structure:
comprises a photopolymer;
is secured directly to and protrudes from said at least one contact pad;
includes an aperture through the length thereof; and
is configured complementarily to a second member of said conductive structure, with said second member secured to a corresponding contact pad of another substrate of another semiconductor device component; and
a conductive center partially filling said aperture of said first member, with said conductive center being laterally confined within at least a base portion of said aperture.

46. (Previously presented) The semiconductor device component of claim 45, wherein said first member comprises a plurality of superimposed, contiguous, mutually adhered layers of said photopolymer.

47. (Previously presented) A semiconductor device assembly, comprising:
at least one semiconductor device having a surface with at least one contact pad exposed thereto;
a substrate having a surface with at least one at least one contact pad exposed thereto, said at least one contact pad located correspondingly to said at least one contact pad of said at least one semiconductor device; and

a conductive structure secured to said at least one contact pad of said at least one semiconductor device and to said at least one contact pad of said substrate, said conductive structure having:

a first member comprising dielectric material secured directly to and protruding from one of said at least one semiconductor device and said substrate, said first member including an aperture therethrough;

a conductive center disposed in said aperture of said first member in communication with said at least one contact pad; and

a second member secured directly to and protruding from another of said at least one semiconductor device and said substrate, said second member located correspondingly to said first member, said second member including an aperture therethrough; and

a conductive center disposed in said aperture of said second member in communication with said at least one contact pad, said second member configured to be interconnected with said first member.

48. (Original) The semiconductor device assembly of claim 47, wherein one member of said first member and said second member has a receptacle configured to receive at least an end of the other member of said second member and said first member.

49. (Original) The semiconductor device assembly of claim 48, wherein said aperture of said one member has an upper portion with a smaller periphery than a base portion thereof.

50. (Previously presented) The semiconductor device assembly of claim 49, wherein said aperture includes an inner ledge disposed between said upper portion and said base portion.

51. (Original) The semiconductor device assembly of claim 49, wherein at least a portion of a wall of said aperture tapers inwardly toward said base portion.

52. (Original) The semiconductor device assembly of claim 49, wherein said aperture is configured to limit a distance the other member is inserted into said receptacle.

53. (Previously presented) The semiconductor device assembly of claim 48, wherein another member of said first member and said second member has an outer surface with a smaller periphery at said end than at a base portion thereof.

54. (Previously presented) The semiconductor device assembly of claim 53, wherein said outer surface includes an outer ledge disposed between said end and said base portion.

55. (Original) The semiconductor device assembly of claim 53, wherein said outer surface tapers outwardly from said end to said base portion.

56. (Original) The semiconductor device assembly of claim 55, wherein said outer surface has a frustoconical configuration.

57. (Original) The semiconductor device assembly of claim 47, wherein said conductive center of at least one of said first and second members comprises an at least partially unconsolidated conductive material.

58. (Original) The semiconductor device assembly of claim 57, wherein said at least partially unconsolidated conductive material is an at least partially uncured conductive resin.

59. (Original) The semiconductor device assembly of claim 58, wherein said at least partially uncured conductive resin is an uncured conductive resin.

60. (Original) The semiconductor device assembly of claim 47, wherein said conductive center of at least one of said first and second members comprises a thermoplastic conductive elastomer.

61. (Original) The semiconductor device assembly of claim 47, wherein said conductive center of at least one of said first and second members comprises a solder, a metal, or a metal alloy.

62. (Original) The semiconductor device assembly of claim 47, wherein at least one member of said first and second members comprises a photopolymer.

63. (Previously presented) The semiconductor device assembly of claim 62, wherein said at least one member comprises a plurality of superimposed, contiguous, mutually adhered layers of said photopolymer.

64. (Original) The semiconductor device assembly of claim 47, wherein said at least one semiconductor device comprises a flip-chip type semiconductor device.

65. (Previously presented) The semiconductor device assembly of claim 64, wherein said flip-chip type semiconductor device is a semiconductor die with bond pads arranged in an array on a surface thereof.

66. (Original) The semiconductor device assembly of claim 64, wherein said flip-chip type semiconductor device is a ball grid array package.

67. (Previously presented) The semiconductor device assembly of claim 47, wherein said at least one semiconductor device comprises a chip-scale package.

68. (Original) The semiconductor device assembly of claim 47, wherein said substrate comprises a carrier substrate.

69. (Original) The semiconductor device assembly of claim 47, wherein said substrate comprises another semiconductor device.

70-141 (Canceled)

142. (Previously presented) A conductive structure for connecting a contact pad of a semiconductor device and a contact pad of a substrate, comprising:
a female member configured to be secured to the contact pad of one of the semiconductor device and the substrate, the female member including an aperture configured to be located over the contact pad;
a conductive center partially filling the aperture with an upper portion of the aperture being open;
a male member configured to be secured to the corresponding contact pad of the other of the substrate and the semiconductor device, the male member including an end configured complementarily to the upper portion of the aperture of the female member, the male member including an aperture configured to be located over the corresponding contact pad; and
a conductive center substantially filling the aperture of the male member,
at least one of the conductive center of the female member and the conductive center of the male member comprising at least partially unconsolidated conductive material.

143. (Previously presented) The conductive structure of claim 142, wherein the aperture of the female member is configured to partially limit insertion of the male member thereinto.

144. (Previously presented) The conductive structure of claim 143, wherein the aperture comprises an inner ledge configured to prevent further insertion of the male member thereinto.

145. (Previously presented) The conductive structure of claim 143, wherein the aperture tapers inwardly.

146. (Previously presented) The conductive structure of claim 142, wherein an outer surface of the male member is configured to partially limit insertion of the male member into the aperture of the female member.

147. (Previously presented) The conductive structure of claim 146, wherein the outer surface is tapered.

148. (Previously presented) The conductive structure of claim 147, wherein the outer surface has a frustoconical configuration.

149. (Previously presented) The conductive structure of claim 146, wherein the male member has an end portion with a smaller periphery than a base portion of the male member.

150. (Previously presented) The conductive structure of claim 149, wherein the outer surface comprises an outer ledge between the end portion and the base portion of the male member.

151. (Previously presented) The conductive structure of claim 142, wherein at least one of the male member and the female member comprises a photopolymer.

152. (Previously presented) The conductive structure of claim 151, wherein the at least one of the male member and the female member comprises a plurality of superimposed, contiguous, mutually adhered layers of the photopolymer.

153. (Previously presented) The conductive structure of claim 142, wherein the aperture of the female member is configured to facilitate alignment of the male member and the female member.

154. (Previously presented) The conductive structure of claim 153, wherein the aperture tapers inwardly.

155. (Previously presented) The conductive structure of claim 142, wherein an outer surface of the male member is configured to facilitate alignment of the male member and the female member.

156. (Previously presented) The conductive structure of claim 155, wherein the outer surface tapers outward from the end to a base portion thereof.

157. (Previously presented) The conductive structure of claim 156, wherein the outer surface has a frustoconical configuration.

158. (Previously presented) The conductive structure of claim 142, wherein the at least partially unconsolidated conductive material is at least partially uncured conductive resin.

159. (Previously presented) The conductive structure of claim 158, wherein the at least partially uncured conductive resin is uncured conductive resin.

160. (Previously presented) The conductive structure of claim 142, wherein at least one of the conductive centers comprises a thermoplastic conductive elastomer.

161. (Previously presented) The conductive structure of claim 142, wherein at least one of the conductive centers comprises a solder, a metal, or a metal alloy.

162. (Previously presented) A semiconductor device component, comprising:
a substrate having at least one contact pad exposed at a surface thereof;
a first member of an alignment structure secured to the at least one contact pad, the first member including an aperture through the length thereof, the first member being configured complementarily to a second member of the conductive structure secured to a corresponding contact pad of another substrate of another semiconductor device component; and
a conductive center comprising at least partially unconsolidated conductive material in the aperture of the first member.

163. (Previously presented) The semiconductor device component of claim 162, wherein the substrate comprises a flip-chip type semiconductor device.

164. (Previously presented) The semiconductor device component of claim 163, wherein the flip-chip type semiconductor device comprises a flip chip die.

165. (Previously presented) The semiconductor device component of claim 163, wherein the flip-chip type semiconductor device comprises a ball grid array package.

166. (Previously presented) The semiconductor device component of claim 162, wherein the substrate comprises a chip-scale package.

167. (Previously presented) The semiconductor device component of claim 162, wherein the substrate comprises a carrier substrate.

168. (Previously presented) The semiconductor device component of claim 162, wherein the first member is configured to contain the conductive center over the at least one contact pad.

169. (Previously presented) The semiconductor device component of claim 162, wherein the conductive center substantially fills the aperture.

170. (Previously presented) The semiconductor device component of claim 169, wherein the first member is configured to be received by an aperture formed in the second member.

171. (Previously presented) The semiconductor device component of claim 169, wherein an outer surface of the jacket has a smaller periphery at an end thereof than at a base portion thereof.

172. (Previously presented) The semiconductor device component of claim 171, wherein the outer surface includes an outer ledge located between the end and the base portion.

173. (Previously presented) The semiconductor device component of claim 171, wherein the outer surface tapers outwardly from the end to the base portion.

174. (Previously presented) The semiconductor device component of claim 173, wherein the outer surface has a frustoconical configuration.

175. (Previously presented) The semiconductor device component of claim 162, wherein the conductive center partially fills the aperture.

176. (Previously presented) The semiconductor device component of claim 175, wherein the aperture is configured to receive at least an end of the second member.

177. (Previously presented) The semiconductor device component of claim 175, wherein an upper portion of the aperture has a larger periphery than a base portion of the aperture.

178. (Previously presented) The semiconductor device component of claim 177, wherein an internal ledge is disposed around at least a portion of a wall of the aperture between the upper portion and the base portion.

179. (Previously presented) The semiconductor device component of claim 177, wherein the aperture tapers inwardly from the upper portion to the base portion.

180. (Previously presented) The semiconductor device component of claim 162, wherein the at least partially unconsolidated conductive material is an at least partially uncured conductive resin.

181. (Previously presented) The semiconductor device component of claim 180, wherein the at least partially uncured conductive resin is an uncured conductive resin.

182. (Previously presented) The semiconductor device component of claim 162, wherein the conductive center comprises a thermoplastic conductive elastomer.

183. (Previously presented) The semiconductor device component of claim 162, wherein the conductive center comprises a solder, a metal, or a metal alloy.

184. (Previously presented) The semiconductor device component of claim 162, wherein the first member comprises a photopolymer.

185. (Previously presented) The semiconductor device component of claim 184, wherein the first member comprises a plurality of superimposed, contiguous, mutually adhered layers of the photopolymer.

186. (Previously presented) A semiconductor device assembly, comprising:
at least one semiconductor device having a surface with at least one contact pad exposed thereto;
a substrate having a surface with at least one at least one contact pad exposed thereto, the at least one contact pad located correspondingly to the at least one contact pad of the at least one semiconductor device; and
a conductive structure secured to the at least one contact pad of the at least one semiconductor device and to the at least one contact pad of the substrate, the conductive structure having:
a first member secured to one of the at least one semiconductor device and the substrate, the first member including an aperture therethrough;
a conductive center disposed in the aperture of the first member, the conductive center in communication with the at least one contact pad; and
a second member secured to another of the at least one semiconductor device and the substrate, the second member located correspondingly to the first member, the second member including an aperture therethrough; and
a conductive center disposed in the aperture of the second member, the conductive center in communication with the at least one contact pad, the second member configured to be interconnected with the first member,
at least one of the conductive center of the first member and the conductive center of the second member comprising an at least partially unconsolidated conductive material.

187. (Previously presented) The semiconductor device assembly of claim 186, wherein one member of the first member and the second member has a receptacle configured to receive at least an end of the other member of the second member and the first member.

188. (Previously presented) The semiconductor device assembly of claim 187, wherein the aperture of the one member has an upper portion with a smaller periphery than a base portion thereof.

189. (Previously presented) The semiconductor device assembly of claim 188, wherein the aperture includes an inner ledge disposed between the upper portion and the base portion.

190. (Previously presented) The semiconductor device assembly of claim 188, wherein at least a portion of a wall of the aperture tapers inwardly toward the base portion.

191. (Previously presented) The semiconductor device assembly of claim 188, wherein the aperture is configured to limit a distance the other member is inserted into the receptacle.

192. (Previously presented) The semiconductor device assembly of claim 187, wherein another member of the first member and the second member has an outer surface with a smaller periphery at the end than at a base portion thereof.

193. (Previously presented) The semiconductor device assembly of claim 192, wherein the outer surface includes an outer ledge disposed between the end and the base portion.

194. (Previously presented) The semiconductor device assembly of claim 192, wherein the outer surface tapers outwardly from the end to the base portion.

195. (Previously presented) The semiconductor device assembly of claim 194, wherein the outer surface has a frustoconical configuration.

196. (Previously presented) The semiconductor device assembly of claim 186, wherein the at least partially unconsolidated conductive material is an at least partially uncured conductive resin.

197. (Currently amended) The semiconductor device assembly of ~~claim 197~~claim 196 wherein the at least partially uncured conductive resin is an uncured conductive resin.

198. (Previously presented) The semiconductor device assembly of claim 186, wherein the conductive center of at least one of the first and second members comprises a thermoplastic conductive elastomer.

199. (Previously presented) The semiconductor device assembly of claim 186, wherein the conductive center of at least one of the first and second members comprises a solder, a metal, or a metal alloy.

200. (Previously presented) The semiconductor device assembly of claim 186, wherein at least one member of the first and second members comprises a photopolymer.

201. (Previously presented) The semiconductor device assembly of claim 200, wherein the at least one member comprises a plurality of superimposed, contiguous, mutually adhered layers of the photopolymer.

202. (Previously presented) The semiconductor device assembly of claim 186, wherein the at least one semiconductor device comprises a flip-chip type semiconductor device.

203. (Previously presented) The semiconductor device assembly of claim 202, wherein the flip-chip type semiconductor device is a semiconductor die with bond pads arranged in an array on a surface thereof.

204. (Previously presented) The semiconductor device assembly of claim 202, wherein the flip-chip type semiconductor device is a ball grid array package.

205. (Previously presented) The semiconductor device assembly of claim 186, wherein the at least one semiconductor device comprises a chip-scale package.

206. (Previously presented) The semiconductor device assembly of claim 186, wherein the substrate comprises a carrier substrate.

207. (Previously presented) The semiconductor device assembly of claim 186, wherein the substrate comprises another semiconductor device.